

Insecticide Resistance Management and Quality Cotton

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The cotton industry in California is dedicated to producing high quality cotton, not only in fiber characteristics but also in cleanliness. For cotton produced in the San Joaquin Valley, preventing sticky cotton is Job #1. Maintaining an effective tool box of control products against aphid and whitefly must also be a priority if growers and PCAs are to meet these quality goals.

The chart on the backside of this leaflet summarizes cotton insecticides and their modes of action (MoA) as defined by the Insecticide Resistance Action Committee (IRAC). IRAC is a collection of crop protection representatives, University researchers and regulators whose goal is to educate about insecticide resistance management (IRM) and assist in the implementation of insecticide resistance management practices. More information from IRAC is available at: <http://www.irc-online.org/index.asp>

This leaflet is designed to assist in making good IRM decisions. The suggestions presented are practices based on the best approaches suggested by IRAC and others working to maintain the efficacy of insecticides. These are not definitive guidelines but rather general suggestions in designing an IRM program.

Using the MoA index:

The Mode of Action (MoA) classification can form the basis for an effective and sustainable IRM program. Insecticides are assigned to specific groups based on their target site. For example, organophosphates and carbamates are assigned to Group 1 whose primary target sites of action are acetylcholine esterase inhibitors. However, the mechanism that OPs attack this target site is different from carbamates. Thus OPs are assigned a 1B while carbamates are assigned 1A. Pyrethroids affect the sodium channel modulators and are classified in Group 3. **Any two insecticides classified by the same MoA index have the same mode of action, whereas unique numbers indicate that these products could be rotated as part of an IRM plan.** For example, if Centric™ (Group 4A) were used against aphids and another application was needed several weeks later, utilizing Lorsban™ (Group 1B) would be a better IRM choice than Provado which is in the same 4A group as Centric.

General IRM Guidelines:

MoA rotation is an important component of an IRM approach. However, an overall IPM approach is required for a robust program and should consider:

- Scout regularly, twice weekly or at least weekly;
- Treat only when necessary based on action thresholds (if available), considering the natural enemies and other pests present
- Include effective biological and cultural controls to suppress pest populations
- Rotate between different mode of actions; understand which products use which mode of action
- Do not use products from the same MoA index more than twice per season;
- Consider the best placement of a product based on pest (or pests), time of year, pest pressure and potential secondary consequences;
- Use products at their recommended rates. Reduced doses quickly select populations with average levels of tolerance;
- Keep application equipment in a well-maintain operating condition.

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| Insecticides & Miticides Associated with Cotton | | | |
|--|-------------------------|-----------------|--------------------|
| Chemical name | Trade name | IRAC MoA | Signal Word |
| aldicarb | Temik | 1A | Poison/danger |
| carbaryl | Sevin | 1A | Caution, warning |
| carbofuran | Furadan | 1A | Poison/danger |
| methomyl | Lannate | 1A | Poison/danger |
| oxamyl | Vydate | 1A | Poison/danger |
| thiodicarb | Larvin | 1A | Warning |
| acephate | Orthene | 1B | Caution |
| chlorpyrifos | Lorsban | 1B | Warning, Danger |
| dimethoate | Dimethoate | 1B | Warning |
| malathion | Malathion | 1B | Caution |
| methamidophos | Monitor | 1B | Poison/danger |
| methidathion | Supracide | 1B | Warning |
| parathion-methyl | Penncap-M | 1B | Warning |
| naled | Dibrom | 1B | Danger |
| oxydemeton-methyl | Metasystox - R | 1B | Warning |
| phorate | Thimet | 1B | Poison/danger |
| profenofos | Curacron | 1B | Warning |
| endosulfan | Thionex, Phaser | 2A | Poison/danger |
| bifenthrin | Capture | 3 | Warning |
| cyfluthrin | Baythroid | 3 | Danger |
| cypermethrin | Ammo | 3 | Caution |
| cypermethrin zeta | Mustang | 3 | Warning |
| esfenvalerate | Asana | 3 | Warning |
| fenpropathrin | Danitol | 3 | Warning |
| lambda-cyhalothrin | Warrior | 3 | Warning |
| permethrin | Pounce | 3 | Caution |
| pyrethrins | Pyrethrin | 3 | Caution |
| imidacloprid | Provado, Gaucho, Admire | 4A | Caution |
| thiamethoxam | Centric, Cruiser | 4A | Caution |
| acetamiprid | Assail | 4A | Caution |
| spinosad | Success | 5 | |
| abamectin | Zephyr | 6 | Warning |
| pyriproxyfen | Knack | 7C | Caution |
| pymetrozine | Fulfill | 9B | Caution |
| hexythiazox | Onager | 10A | Caution |
| etoxazole | Zeal | 10B | Caution |
| bacillus thuringiensis kurstaki HD-1 | Dipel | 11B2 | Caution |
| bacillus thuringiensis aizawai | Xentari | 11B1 | Caution |
| bacillus thuringiensis kurstaki SA-11 | Javelin | 11B2 | Caution |
| propargite | Comite | 12C | Danger |
| buprofezin | Courier | 16 | Caution |
| tebufenozide | Confirm | 18A | Caution |
| methoxyfenozide | Intrepid | 18A | Caution |
| fenpyroximate | Fujimite | 21 | Warning |
| indoxocarb | Steward | 22 | Caution |
| spiromesifen | Oberon | 23 | Caution |
| bifenazate | Acramite | 25 | Caution |
| dicofol | Kelthane | UNC | Caution |
| cyfluthrin, imidacloprid | Leverage | 3, 4A | Warning |

MoA is Mode of Action classification assigned by IRAC.v 4.2

View Complete Mode of Action List at Insecticide Resistance Action Committee (IRAC)

<http://www.irc-online.org/> PB Goodell - Rev July 05 - UC Cooperative Extension

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